

# Rational Expressions

**Simplify each expression.**

$$1) \frac{\frac{4}{x^2}}{\frac{y^2}{x} + \frac{2}{y}}$$

$$2) \frac{\frac{ab}{b} - \frac{2b}{a^2}}$$

$$3) \frac{\frac{2}{a^2}}{\frac{a}{b^2} - \frac{2}{b^2}}$$

$$4) \frac{\frac{y^2}{x^2}}{\frac{4}{y^2} + \frac{2}{y^2}}$$

$$5) \frac{\frac{n}{m}}{\frac{m}{n} - \frac{1}{m}}$$

$$6) \frac{\frac{2}{m^2} - \frac{2m}{n}}{\frac{3}{2m} - \frac{4}{9}}$$

$$7) \frac{\frac{y}{4} - \frac{y}{2}}{\frac{yx}{3} - \frac{x^2}{9}}$$

$$8) \frac{\frac{4}{y} - \frac{2}{y}}{\frac{y^2}{4} + \frac{x^2}{9}}$$

$$9) \frac{\frac{9}{x} + \frac{2}{yx}}{\frac{x^2}{2} - \frac{3}{y}}$$

$$10) \frac{\frac{9}{2u} - \frac{3}{v}}{\frac{1}{v} - \frac{4}{u^2}}$$

**Solve each equation. Remember to check for extraneous solutions.**

$$11) \frac{1}{n^2 - 2n - 3} + \frac{1}{n + 1} = \frac{4}{n^2 - 2n - 3}$$

$$12) \frac{3x - 12}{2x} = \frac{1}{x} + 1$$

$$13) \frac{3}{2m} = \frac{1}{2m^2 + 4m} + \frac{m + 4}{m^2 + 2m}$$

$$14) \frac{3}{r} = \frac{1}{r} + 1$$

$$15) \frac{1}{n} - \frac{n^2 - 1}{n} = 1$$

$$16) \frac{x^2 - x - 6}{x^2 + 3x} + \frac{3}{x^2 + 3x} = 1$$

$$17) \frac{1}{b} = \frac{4}{b^2 - b} + \frac{b - 4}{b}$$

$$18) 1 = \frac{1}{r + 3} + \frac{r - 1}{r - 2}$$

$$19) 1 = \frac{x + 1}{x^2 + 3x - 4} + \frac{2x + 4}{x^2 + 3x - 4}$$

$$20) 4 + \frac{n - 2}{n^2 + n - 12} = \frac{1}{n^2 + n - 12}$$

## Answers to Rational Expressions

$$1) \frac{4y}{xy^3 + 2x^2}$$

$$5) \frac{n^2}{m^2 - n}$$

$$9) \frac{18y + 4}{x^3y - 6x}$$

$$13) \{3\}$$

$$17) \{3\}$$

$$2) \frac{2a^3}{a^2 - 4}$$

$$6) \frac{36n - 36m^3}{27mn - 8m^2n}$$

$$10) \frac{9uv - 6u^2}{2u^2 - 8v}$$

$$14) \{2\}$$

$$18) \left\{-\frac{1}{2}\right\}$$

$$3) \frac{2b^2}{a^3 - 2a^2}$$

$$7) -\frac{9y}{12xy - 4x^2}$$

$$11) \{6\}$$

$$15) \{-2, 1\}$$

$$19) \{-3, 3\}$$

$$4) \frac{y^4}{6x^2}$$

$$8) \frac{72}{9y^3 + 4yx^2}$$

$$12) \{14\}$$

$$16) \left\{-\frac{3}{4}\right\}$$

$$20) \left\{-\frac{17}{4}\right\}$$